

The Effects of Seeding Rate and Fungicide Application on Field Peas in Manitoba



Greg Bartley and Laryssa Stevenson
Manitoba Pulse & Soybean Growers – Carman, MB



Introduction

- Crop yield responses to individual inputs, such as foliar fungicide, are often evaluated in small-plot research or on-farm trials. However, it is not well understood how the combination of such inputs interact and affect yield.
- A recent multi-input research study conducted in Manitoba and Saskatchewan assessed the impact of five inputs, applied alone and in various combinations.
- Two important inputs were identified from this study for maximizing yield and economic returns for field peas: 1) a high seeding rate and 2) foliar fungicide.¹
- Unfortunately, this study lacked a detailed range of seeding rates between the low and high extremes, and did not assess the effect of a single application of fungicide compared to two applications.

Objectives

- Validate the optimal plant stand recommendation for field peas in Manitoba.
- Determine if there is an interaction between seeding rate and number of foliar fungicide applications on field pea yield.
- Determine the probability of response to foliar fungicide in On-Farm Network field trials.

Materials and Methods

- CDC Meadow peas were direct seeded into wheat stubble on 8-9" row spacing from May 9 to 12 at:
 - Minto (2015 and 2016)
 - Hamiota (2016)
- Seeding rates tested were 60, 80, 100, 120 and 140 seeds/m², in combination with 1) no fungicide, 2) one application of fungicide (Headline EC at 10% flower) or 3) two applications of foliar fungicide (Headline EC at 10% flower + Priaxor 12-13 days later).
- The factorial set of treatments were arranged in a randomized complete block design with four replicates.
- On-Farm Network trials were established in 2017 on six farms in Manitoba testing a combination of either 1) no fungicide, 2) one application of fungicide (early flower) or 3) two applications of fungicide (7 to 14 days after the first application).

Results

Small-Plot Trials

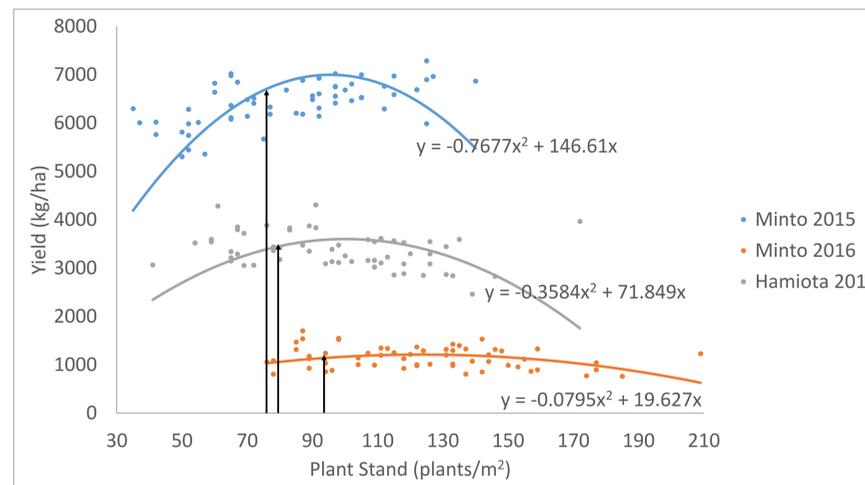


Figure 1: Regression analysis demonstrating the quadratic relationship between field pea plant stand and yield at Minto (2015 and 2016) and Hamiota (2016).

Table 1: Field pea yield at Minto (2015 and 2016) and Hamiota (2016) for no fungicide, one application and two applications of fungicide.

Treatment	Minto		Hamiota
	2015	2016	2016
No Fungicide	91.4 b	14.7 c	46.8 b
One Application	95.6 a	16.2 b	48.9 b
Two Applications	97.1 a	19.9 a	53.8 a
P-Value	0.0009	<.0001	<.0001

- The optimum plant populations that reached 95% of the maximum yield were 74, 78 and 96 plants/m² at Minto (2015 and 2016) and Hamiota (2016), respectively (Figure 1).
- There was no interaction between seeding rate and fungicide application observed at any site year.
- In 2015, there was a significant effect of fungicide application compared to no fungicide; however, there was no difference between one application and two applications of fungicide (Table 1).
- At Hamiota (2016), there was a significant yield response to two applications of fungicide and no response to one application of fungicide.
- At Minto (2016), there was a significant yield response to both one and two applications of fungicide. Two applications of fungicide resulted in the highest yield; however, the overall yield potential was low at this site.

On-Farm Network Trials

Table 2: Field pea yield for no fungicide, one application or two applications of fungicide at six On-Farm Network field trials across Manitoba in 2017.

Trial ID	R.M	Treatment			P-Value	CV
		No Fungicide	One Application	Two Applications		
		----- bu/ac -----				
2017-PF01	Montcalm	58.5 b	64.5 a	-	0.0399	7.2
2017-PF02	Roland	48.4 b	56.7 a	60.4 a	0.0013	10.0
2017-PF03	Wallace - Woodworth		43.4	43.7	0.8402	3.7
2017-PF04	Rockwood	80.1 b	82.1 a	-	0.0238	1.6
2017-PF05	Two Borders	51.7	55.0	53.0	0.7532	11.0
2017-PF06	Rhineland	-	66.4 b	73.4 a	0.0017	5.7

- A significant yield response was observed at four out of the six on-farm trials.
- The probability of response to one application of fungicide was 75% (n=4), while the probability of response to an additional application of fungicide (two applications) was 25% (n=4) in 2017.

Summary

- The optimal plant population for maximized yield in Manitoba was between 74 and 96 plants/m².
- There was no interaction observed between seeding rate and fungicide application at any site year.
- The probability of response to fungicide application in On-Farm Network field trials was 75% for one application of fungicide (n=4) and 25% for an additional application of fungicide (n=4) in 2017.

Reference

- Grenkow, L., Johnson, E., Brandt, S., Phelps, S., Holzapfel, C., Nybo, B., and Kirk, A., 2016. Investigating input combinations for field pea production. Crops & Soils Magazine. 49: 16-19.

Acknowledgements

- MPSG would like to thank Bayer for providing fungicide for the On-Farm Network field pea trials.
- Visit manitobapulse.ca/on-farm-network to view single page reports for On-Farm Network field pea trials.